WITH EFFECT FROM THE ACADEMIC YEAR 2005-2006

SCHEME OF INSTRUCTION & EXAMINATION

B.E IV YEAR (REGULAR)

(PRODUCTION ENGINEERING)

SEMESTER - I

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions Periods per Week L/T	D/P	Scheme of Examination Dura-tion in Hrs	Maximum Marks Univ. Exam	Sessionals
		THEORY					
1.	ME 401	Production and Operations Management	**4**	**-**	**3**	**75**	**25**
2.	ME 403	Metrology and Instrumentation	**4**	**-**	**3**	**75**	**25**
3.	ME 405	Operations & Research	**4**	**-**	**3**	**75**	**25**
4.	ME 409	Tool Design	**4**	**-**	**3**	**75**	**25**
5.	ME 412	Control System Theory	**4**	**-**	**3**	**75**	**25**
6.		**ELECTIVE – I**	**4**	**-**	**3**	**75**	**25**
		PRACTICALS					
1.	MP 431	Manufacturing Lab	**-**	**3**	**3**	**50**	**25**
2.	ME 432	Metrology & Instrumentation Lab	**-**	**3**	**3**	**50**	**25**
3.	ME 433	Project Seminar	**-**	**3**	**-**	**-**	**25**
		TOTAL	**24**	**9**	**-**	**550**	**225**

Elective –I

ME 401: Total Quality Management
ME 404: Finite Element analysis
ME 406 Fuzzy logic and Neural Networks
ME 407 Automobile Engineering
ME 410 Microprocessor Applications
ME 411: Entrepreneurship
.

ME 401

PRODUCTION AND OPERATIONS MANAGEMENT

Instruction:	4 Periods per week
Duration of University Examination	3 Hours
University Examination:	75 Marks
Sessionals:	35 Marks

Unit-I

Scientific Management by Taylor and Fayol. Functions of Management Types of Business firms and organizations structures.Manufacturing Process Technology: Project, job shop, batch, assembly line and continuous process technology; flexible manufacturing systems.

Unit-II

Locating production and service facilities, effects of location and costs and revenues, factor rating, simple median model.

Layout planning: process layout: product layout-Assembly lines; manufacturing cellular layout.

Scheduling systems and aggregate planning for production and services; operations planning and scheduling systems; loading assignment algorithm; priority sequencing and other circuits.

Unit-III

Work methods analysis, work measurement techniques; predetermined time study; work sampling managing for quality; process variation; statistical process control charts for variables and attributes.

Unit-IV

Material Handling:

Earthmoving Machinery: Types, working and applications of excavators, tractors and scrapers. Operation and selection of (a) Hoisting equipment: cranes, trucks and wagons; (b) conveying equipment: Belt, Screw and bucket conveyor systems aerial ropeway. Principles of pneumatic and hydraulic conveying systems: automatic handling, AGV, RGV.

Unit-V

Japanese management overview, value added manufacturing, Japanese manufacturing techniques; total quality emphasis-Deming contribution to TQM, quality circles; fishbone diagram, Taguchi method of quality control, push or pull system kanban system.

Suggested Reading:

1. Everett, E. Adam. Jr and Ronald. J.Ebert- “Production and operations management-concepts,models and behaviour”-Prentice Hall (India) Pvt Ltd. New Delhi, 5th ed . 1998.
2. Lee J.Krajewski,Larry.P.Ritzman,”operations Management:Strategy and Analysis”-Addison Wesley Longman(Singapore) Pvt Ltd.,India Branch, 5 th ed. 2000 year.
3. Richard B.Chase,Nicholas,J.Aquilano and F.Robert Jacobs.”Production and operations management-manufacturing and services”-Irvin McGraw-Hill,New Delhi,5th ed. 1998.
4. Maheeshverma,”Conservation equipment and its planning and application”-Metropolitan book Co.Pvt.Ltd,New Delhi,3rd ed 1997.

ME 403

METROLOGY AND INSTRUMENTATION

Instruction:	4 Period per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessionals	25 Marks

Unit-I

Introduction-Linear and Angular measurements-Slip gauges and End bars- Guage material and manufacturing methods, Different types of Micrometers, Height gauges, Tomlinson gauges. Precision polygon, Sine Bar, Auto collimator, Dial indicator, Sigma and Mechanical comparator, Free flow and Back pressure type Pneumatic comparator. Application of jet guage heads.

Unit-II

Optical projector, Chart gauges, Micro gauge bridge lines. Tool maker's Microscope, Coordinate Measuring Machine. Measurement of Straightness and Flatness. Roundness Measurements with bench centers and talyrond Surface Roughness Measurement Profilometer, Taylor Hobson Talysurf.

Unit-III

Limits and Fits, ISO systems: Types of interchangeability. Taylor's Principle for plain limit gauges. Use of Plug, Ring and Snap gauges. Indicating type limit gauges. thread metrology-2wire and 3 wire methods, Gear measurement –Gear tooth thickness. Parkinson gear tester Gear measurement by gratings, General geometric tests for testing machine tools.

Unit-IV

Elements of instrumentation system. Static and Dynamic characteristics. Types of error Displacement transducers. LVDT. Strain measurement-Wire and foil type resistance strain gauges. Rosette Gauges .Bonding procedure. Lead resistance compensation. Adjacent arm and self compensating gauges. Proving ring. Strain gauge load cells. measurement of axial load and torsion by strain gauges. Piezo electric load cell.

Unit-V

Introduction to Seismic Transducers- displacement and acceleration measurement, Pressure measurement-Bourdon pressure gauge. bulk modulus guage, pirani guage, Temperature measurement by thermo couples. Laws of thermo electricity. Types of materials used in thermocouples. Protection tubes. Extension wire. Series and parallel circuits. Ambient temperature compensation.

Suggested Reading:

1. R.K. Jain, "Engineering Metrology",Khanna Publications,1996.
2. P.Donald Echman, "Industrial Instrumentation", John Wiley and Sons.1996.

3. Hume, "Engineering Metrology",Kalyani Publications.1985.
4. Doeblin, "Measurement Systems Application and Design",Tata McGraw Hill
5. 5th ed. 2004.

ME-405

OPERATIONS RESEARCH

Instruction:	4 Periods per Week
Duration of University Examination	3 Hours
University Examination:	75 Marks
Sessional	25 Marks

Unit-I

Introduction to Operations Research, simulation and art of modeling. Construction of Linear Programming(LP) model. Standard LP form and determination of basic solutions. Unrestricted variables and solutions. Simplex method, Big-M method. Two phase method, Degeneracy, Unbounded solution, infeasible solution.

Unit-II

Duality: Definition, Relationship between optimal primal and dual solutions. Economic interpretation, Dual simples method, Post optimal or sensitivity analysis integer programming.

Unit-III

Transportation model, Transportation algorithm. Assignment model, Hungarian method Transshipment model. Traveling salesman problem, Dynamic Programming .Knapsack problem, Problem of dimensionality.

Unit-IV

Network model: Minimum spanning tree algorithm. Shortest route problem, Maximal flow model. Minimum cost capacitated flow problem, Theory of games.

Unit-V

Probabilistic dynamic programming, Queuing models, Poisson queue, single server and multiple server models.

Decision Analysis: Decision criteria, Decision Trees, Sensitivity analysis with Decision trees, Using Utilities to Better reflect the value of payoffs. The practical application of decision analysis.

Suggested Reading:

1. Hamdy, A. Taha, "Operations Research-An Introduction", Sixth Edition, Prentice Hall of India Pvt Ltd.,1997.
2. Harvey M. Wagner," Principles of Operations Research", Second Edition, Prentice Hall of India Ltd., 1980.
3. F..S. Hiller, M.S. Hiller "Introduction to Management Science " Second Edition Tata McGraw Hill , 2003.
4. S.D. Sharma, " Operations Research", Kedar Nath Ram Nath & Co., 2004

ME 409

TOOL DESIGN

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

Unit-I

Cutting tool materials and processes: Desired properties, Types, major constituents, relative characteristics, latest developments, ISO: Classification and coding of carbide tools, Coated tools. Principles of working and applications of USM, EDM, ECJv1, AJM, LBM, and EBM. Super finishing processes: Honing, Lapping Burnishing, Ballizing, Polishing.

Unit-II

Design of single point cutting tools, Form Tools: Design of frat and circular Form Tool correction and tool holding methods. .

Design of Multi Point Cutting tools: Milling Cutters: Major types, design and manufacturing of peripheral, end and -face milling cutters_ forces and power estimation. Grinding of milling cutters.

Broaches: Pull and Push types. Internal and External broaches, geometry and design and manufacturing of Pull type and push type broaches.

Unit-III

Multi point cutting tools:

Twist Drill geometry, Design and manufacturing of twist drill. Effect of variation of different angles on torque and thrust forces. Types and design of shanks. Sharpening of twist drill. .

Reamers: Reamers: Types. geometry, Reaming allowance tolerance disposition, Design and manufacture of twist-drills.

Taps and Dies: Types:: Geometry, Design and manufacturing of Taps and Dies. .

Unit-IV

Design of Press tools: Die set elements. Design of Die set for simple components by Blanking, Piercing, bending, Drawing, Forging and Spinning.

Plastic Tools: Plastic Dies for simple components.

Unit-V

Jigs & Fixtures: Design principles and construction features. Locating methods associated with flat, cylindrical internal and external surfaces. Type of locating pins. Requirements and choice of locating systems. Redundant location, fool proofing. Setting blocks, types of clamping devices and their basic elements. Quick action clamps and nuts. Equalizing and multiple clamping pneumatics. Hydraulic, magnetic, electrical and vacuum clamping.. Types of drill jigs and their classification. Types of jig bushes, jig feet, indexing jigs. Design of Fixtures for Turning, grinding, welding and Milling. Economic analysis of Jigs and Fixtures.

Suggested Reading:

1. Donaldson, Leain and Goold, "Tool Design", Tata McGraw Hill, NewDelhi, 1983.
2. "Rodin -Design of cutting tools", Mir Publications, Moscow.

3. Amitabha Battacharya and Inyong Ham, "Design Of Cutting Tools, Use Of Metal Cutting Theory",
ASTME publication Michigan USA., 1969. "
4.Surender Keshav & Umesh Chandra -"Production Engineering Design (Tool Design)", Satya Prakashan, New Delhi-1994

ME 412

CONTROL SYSTEMS THEORY

Instruction:	4 Periods per Week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessionals	25 Marks

Unit – I
Control Systems Classification: Open loop & Closed & Loop Systems. Mathematical models and transfer functions from governing equations of mechanical, electrical, hydraulic pneumatic thermal systems, AC DC servomotors & Electromechanical servo systems.

Unit – II
Block Diagrams, Block diagram reduction, Signal flow graphs, Mason's gain formula. Transient response, Time domain specifications of 1^{st} and 2^{nd} order systems. Steady state error, Error coefficients, sensitivity Perfromance indices. Routh criteria.

Unit – III
Routh criteria, Root locus method. Frequency Resoponse: Bode, Polar plots Correlation between transient and frequency response, Bandwidth, Experimental determination of transfer functions.

Unit – IV
Nyquist criteria. Gain and phase margins, Lead, Lag and Lead-lag compensator design, PID controller, linearization of Non linear systems,

Unit – V
State - space representation of linear control systems. State transition matrix. Solution of state equations: Zero input response and Zero state response. Concept of controllability and observability.

Suggested Reading:

1. Dorf. R.C. "Modern Control Systems", Addission-Wesley, 1989.
2. M. Gopal, "Control Systems", Tata Mc GrawHill, 2004.
3. Ogata, K., "Modern Control Engineering ",Prentice Hall, 2004.
4. Norman S. Nise, "Control Systems Engineering", John Wiley & Sons, Inc.,2001.

ME 431

MANUFACTURING ENGINEERING LAB

Instruction:	3 Periods per Week
Duration of University Examination	3 Hours
University Examination:	50 Marks
Sessional	25 Marks

One of the following items are to be manufactured using all the production processes as far as possible and assembly techniques with fits and tolerances using CAD system.

1. V Block with U clamp
2. Dial test indicator stand
3. Sinmple Jig
4. Simple fixture
5. Simple die test
6. Gear pump using spur gears
7. Cam-operated valve mechanism(An eccentric mechanism)
8. Machine vice
9. Simple tail stock mechanism
10. Lathe tool post
11. Milling machine arbor
12. Pipe vice
13. 2 Axis table
14. Paper Punch(Double punch)
15. Hydraulic cylinder
16. Gear box(Spur, helical or worm)

ME 432

METROLOGY AND INSTRUMENTATON LAB

Instruction:	3 Periods per Week
Duration of University Examination	3 Hours
University Examination:	50 Marks
Sessional	25 Marks

1. Measurement with inside, outside and depth micrometers.

2. Measurement with height gauges, height master, etc.

3. Measurement of Linear and Angular dimensions with Tool Maker's Microscope-Flat specimen's plain, cylindrical specimens with centers and threaded components.

4. Measurement with Dial Indicator /Electrical Comparator/Mechanical Comparator/Dial Bore Gauges, etc.

5. Measurement of angles with Sinebars, Bevel protractor and Precision level, Block level, etc.

6. Measurement roundness error with bench centers.

7. Geometrical tests on Lathe machine.

8. Measurement of flatness error (surface plate) with precision level.

9. Measurement with optical projector.

10. Checking machined components with plug guage, adjustable snap gauge, indicating guage ,etc.

11. Force measurement with strain guage type load cell / proving ring/piezoelectric load cell etc.

12. Temperature measurement with thermocouples

ME 433

PROJECT SEMINAR

Instruction	3 Periods per week
Sessional	25 Marks

The Objective of the Project Seminar is to actively involve the student in the intial work required to undertake the final year project. It may comprise of:

- Problem definition and specifications
- A broad understanding of the available techniques to solve a problem of interest
- Presentation (Oral and Written) of the project.

The Department can initiate the work related to project allotment at the end of III year II semester and complete it in the first two weeks of the fourth year I semester.

First 4 weeks of IV year Ist semester will be spent on special lectures by faculty members, research scholar speakers from industries and R & D institutions. The objective of these talks is to expose students to real life/practical problems and methodologies to solve them.

A seminar schedule will be prepared by the coordinator for all the students. It should be from the 5^{th} week to the last week of the semester and should be strictly adhered to.

Each student is required to:

1. Submit a one page synopsis before the seminar talk for display on the notice board
2. Give a 20 minutes presentation through OHP, PC, Slide projector followed by a 10 minute discussion.

3. Submit a report on the seminar topic with a list of reference and slides used.

Atleast two teachers will be associated with the evaluation of the project seminar for the award of the Sessional marks which should be on the basis of performance on all the three items stated above

Note: Three periods of contact load will be assigned to each project guide

MP 401

TOTAL QUALITY MANAGEMENT

Instruction:	4 Period per Week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessionals	25 Marks

Unit I

Strategic Quality Management: Quality policies, quality goals, obstacles to achieving successful strategic quality management. Organization for Quality role of (Top, middle, work force team. (Quality circles).Developing, a quality work culture - Maslow need theory: Herzberg 2 factor theory, theory X, Y & Z. Methods to create and maintain awareness of quality, provide evidence of management leadership, types of self development and empowerment Programmes, methods of participations means of inspiring action, recognition and rewards. Supplier quality: Supplier quality, rating plans (lot plot plan, OC curve, Pareto analysis) assignment of supplier capability. Methods of evaluating supplier products, contract manage merit (Joint economic plan, join technological forecasting).

Unit-II

Design for quality: Basic functional requirements of quality, Design for (reliability, safety, cost and product performance) concurrent engineering (DFMA) value engineering. Suppo/1 for quality improvement processes (block diagram, brain storming, cause effect analysis, Pareto analysis) Quality function development, reliability analysis, failure rate, failure pattern of complex products (bath tub curve) weibull distribution relationship between part and the system exponential reliability, availability, FMEA (Fracture mode and effect analysis) Design for experiments: Factorial experiments, constructing fractional designs.

Unit-III

Technical tools for quality: Comparison of two methods: observation of data, distribution, statistical analysis, chi square test, F test, T test, l1ypothesis testing, signifi6anc_ testing, linear correlation and regression. Analysis of variance (ANOVA) 4 factor ANOVA experiment 2 levels. Analysis of means. Techniques for on line quality: Data collection plan, variable an attribute charts, interpreting the control charts, charts for drifting processes, multi variant charts, alternatives to statically process controls. Techniques for off line quality control: Background to Taguchi method (Quality loss and loss function, controllable factor and non controllable factors in parameter performance, tolerance design. Taguchi Analysis Techniques: Net variation and contribution ratio, estimation of process performance. Accumulating analysis, performance measures-avoiding means variance dependents, choosing noise performance measure, minute analysis and life testing Taguchi tolerance design and tolerance (re) design.

Unit-IV

Quality Information System: Scope of quality information system, different between QIS and MIS. Creating new software (steps, types, defects) reports -. on quality (operational and executive reports) Features of QIS software. Software for inspection.

Inspection system: Operational sorting and correction sorting, AQL, LTPD, AOQL, Non destructive test. Audit systems: (quality improvement planning and implementation, describing quality function, process control system, - control of measurement system, material identification and control, drawing and specification control, process corrective action) the concept of POKA YOKE.

Unit-V

Measure of customer needs: The need to measure customer satisfaction. Importance of proper packaging, customer processing and installation of product, dealing with customer complaints, using weibull analysis, field feed back, parameter to measure customer (Dis) satisfaction. Problems with the customer satisfaction system. Beyond TQM: Difficulties in implementing TQM system, rating your quality system. JIT system, the people side of TQM, system integration, Kansei engineering and flexibility in manufacturing.

Suggested Reading:

1. H.G. Menon, TQM in view Production Manufacturing, Mc Graw Hill,Publishers.
2. N.G. Logothetis, Managing for total quality.
3. J.M. Juran & Frank Gryna, Quality planning and analysis.
4. Hanson and Ghare, Quality control and application.

ME 404

FINITE ELEMENT ANSLYSIS

Instruction:	4 Period per Week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessionals	25 Marks

Unit-I

Introduction to Finite Element Method for solving field problems. Stress and Equilibrium, Boundary conditions, Strain, displacement, stress-strain relations.

One dimensional problems: Finite element modeling, coordinates and shape functions, Potential Energy approach: Assembly of Global stiffness matrix and load vector. Finite element equations, treatment of boundary conditions, quadratic shape functions.

Unit-II

Analysis of trusses and frames: Element stiffness matrix for a truss member. Analysis of plane truss with number of unknowns not exceeding two at each node. Analysis of frames with two translations and a rotational degree of freedom at each node. Analysis of Beams: Element stiffness matrix for two nodes, two degrees of freedom per node beam element.

Unit III

Finite element modelling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions. Finite element modelling of axi-symmetric solids subjected to axi-symmetric loading with triangular elements.

Unit-IV

Two dimensional four nodded iso-parametric elements and numerical integration. Steady state heat transfer analysis: One dimensional analysis of a fin and two dimensional analysis of thin plate. Analysis of a uniform shaft subjected to torsion.

Unit-V

Dynamic Analysis: Formulation of finite element model, element matrices, evaluation of Eigen values and Eigen vectors for a stepped bar an a beam. Time dependent field problems: Application to one dimensional heat flow in a rod. Introduction to Finite element formation for three dimensional problems in stress analysis. Convergence requirements. Introduction to Finite Element Analysis Software.

Suggested Reading:

1. Tirupathi. R Chandraputla and Ashok .D Belagundu, "Introduction to Finite Element in Engineering ", Practice Hall of India, 1997.
2. S.S. Rao, " The Finite Element Method in Engineering",Pergamon Press, 1989.
3. Segerlind .L.J., "Applied Finite Element Analysis", Wiley Eastern, 1984.
4. J.N.Reddy., "An Introduction to Finite Element Method", McGraw Hill, 1984.

ME 406

FUZZY LOGIC & NEURAL NETWORKS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT -I

Introduction: Knowledge- based information processing. A general view of Knowledge based algorithm. Neural Information processing. Hybrid Intelligence. Artificial Neuron.

UNIT -II

Basic Neural Computation Models:
Basic concepts of Neural Networks -Network properties, Node properties. sigmoid functions. System dynamics, Inference and learning algorithm. Data representation. Functional classification models -single layer perceptions. Multi layer perceptions.

UNIT –III

Learning: Supervised and unsupervised statistical learning. Al learning.
Neural Network Learning -Back.Propagation algorithm and derivation. Stopping criteria. Complexity of Learning Generalization.

UNIT -IV
Self-organizing Networks:
Introduction, The Kohonen algorithm. Weight initialization, weight training, associative memories, bi-directional associative memories.

UNIT-V
Hopfield Networks:
Introduction. The Hopfield model, Hopfield network algorithm. Boltzman's machine algorithm. Neural Network applications.

Suggested Reading:

1. Limin Fu: Neural Networks in Computer intelligence. Tata McGraw Hill, 2003.
2. Bart Kosko: Neural Networks and Fuzzy systems, Prentice Hall of India, 1994.
3. James A. Freeman: Simulating Neural Networks, Addison Wesley Pub, 1995

ME 411

AUTOMOBILE ENGINEERING

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

Unit-I
Types of automobiles: Normal, Hybrid and Hydrogen Fuel vehicles. Engine location and its components, chasis layout, crank shaft proportion, firing order, piston and piston rings, cylinder liners, valves and operation mechanism, inlet and exhaust manifolds, carburetion and fuel injection system, Mechanical Fuel Injection system & Electronic Fuel Injection system.

Unit-II
Lubricating systems: Wet sump, dry sump and petroil systems.
Cooling systems: Water pumps, radiators, thermostat control anti freezing compounds.
Types of Ignition Systems, Modern Ignition systems, Types of batteries and charging systems, starting motors, lighting and electrical accessories, automobile air-conditioning.

Unit-III
.Steering systems: Linkage arrangements and its components modified Ackerman linkage-Wheel alignment, caster and camber. Rack and pinion assembly - Recent Trends.
Wheel and tyres: Tyre construction, specification. Tyre wear and causes, wheel balancing, Types of Suspension system, independent suspension, coil and leaf springs, torsion bar, shock absorbers.
Unit-IV

Power Train: Clutches, gear and gearbox manual, semi-automatic and automatic gearboxes. Torque converter, propeller shaft, universal coupling differential, Four-wheel drive system.
Brakes Systems: Description and operation of hydraulic brake, leading and trailing shoe layout, disc brakes, master cylinder, hand brake linkage - Recent Trends.

Unit-V
Maintenance: Pollution control, trouble shooting and servicing procedure overhauling, engine tune up, tools and equipment for repair and overhaul, testing equipment, pollution control technologies used for petrol and diesel engines, types and study of catalytic converters, Euro norms 2 & 3 and Bharat Norms - Recent Trends.

Suggested Reading:

1. CROUSE & Anglin, 'Automotive Mechanics', Tata McGraw Hill, Publishing Co. Ltd., New Delhi, Tenth Edition - 2004.
2. KirpaISingh., Automobile Engineerihg,Vol.l & II Standard Publishers, Delhi.
3. Joseph Heitner, Automotive Mechanics_Affiliated East West Pvt. Ltd.
4. C.P. Nakra, Basic Automobile Engineering, Dhanpat Rai Publishing Co.(P} Ltd., New Delhi, 2003.

ME 410

MICROPROCESSOR APPLICATIONS

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Unit-I
Basic Concepts: Wheel and the microprocessor - what is a microprocessor? – 4-8-16-32- Evolution of microprocessors - organization of microcomputers - microprocessor programming - digital logic - timing diagram conventions.
Data Representation: Introduction - positional number systems -the binary number system - representation of integers - representation of. real number - binary arithmetic - other number systems - character representation.

Unit-II
Programming a microprocessor: Introduction - organization of the 8085 instruction set of the 8085 - programming the 8085 – assembler programming -language for writing. Algorithms - programming examples - the Zilog80.

Unit-III
Semi conductor memom0ries: Introduction -characteristics of memories static rams- dynamic RAMS.
Re-programmable ROMS - Memory system reliability.
Microprocessor Timings: Introduction - timing and control unit - timings of Intel 8085 - timing of zilog Z80 - register organization.

Unit-IV

Interfacing memory and I/O Devices: Introduction address space partitioning - memory interfacing -data transfer schemes - programmed data transfer direct memory access data transfer - serial data transfer.
Interfacing Devices: Introduction - types of interfacing devices - address decoding for I/O - INPUT/OUTPUT ports - programmable interrupt controller- programmable DMA controller - communication interface - analog input devices - analog output devices - an log input subsystems - analog output subsystems.

Unit-V
Application of micro processors: Introduction - a temperature monitoring system - automotive applications- closed loop process control.

Suggested Reading:
1. Aditya P. Mathur, " Introduction to Microprocessors", Tata McGraw Hill publishing company Ltd.,New Delhi.2002
2. "RAM B, "Fundamentals of microprocessors al)d micro-computers", Dhanpat Rai & Sons 2000.
3. M. Rafiq - uz - zaman., " Microprocessors theory and applications., PHI,2001.

ME 411

ENTREPRENEURSHIP

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

Unit –I
Indian Industrial Environment – Competence, Opportunities and challenges, Entrepreneurship and economic growth. Small Scale Industry in India Objectives, Linkage among small medium and heavy industries. Types and forms of enterprises.
Unit –II
Identification and characteristics of entrepreneurs. Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Conception and evaluation of ideas and their sources. Choice of Technology – Collaborative interaction for Technology development.
Unit –III
Project formulation. Analysis of market demand. Financial and profitability analysis and technical analysis. Project financing in India.
Unit –IV
Project Management during construction phase, project organization, project planning and control using CPM, PERT Techniques. Human aspects of project management. Assessment of tax burden.
Unit – V
Behavioral aspects of entrepreneurs: Personality – determinants , attributes and models. Leadership concepts and models. Values and attitudes. Motivation aspects. Change behavior.
Time Management: Various approaches of time management, their strengths and weaknesses. The urgency addiction and time management matrix.

Suggested Reading:

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalya Publishing House, 1997.
2. Prasanna Chandra, Project – Planning. Analysis, Selection, Implementation and Review, Tata McGraw Hill publishing Company Ltd. 1995.
3. Stephen R. Covey and Roger Merrill A., First Things First, Simon and Schuster publication, 1994.
4. Sudha G.S., Organizational Behaviour, National Publishing house, 1996